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Research Article

**PRESCRIPTION PATTERN OF ANTIBIOTICS USED IN THE  
MANAGEMENT OF RESPIRATORY TRACT INFECTIONS IN  
PAEDIATRIC POPULATION****Kousalya Prabahar<sup>\*1</sup> and Praveen D<sup>2</sup>**

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**Abstract:**

**Background:** Antibiotics are the most frequently prescribed drugs in paediatrics. However, the threat of antibiotic resistance among children is a reason for apprehension. The frequent use of antimicrobial drugs, primarily antibiotics has become a predictable practice for the treatment of paediatric infections.

**Methods:** A study of the prescription patterns of antibiotics in respiratory tract infections was carried out on children admitted to a paediatric ward of tertiary care hospital for a period of 8 months, using a prepared structured questionnaire/proforma. Accuracy of doses was assessed by the guidelines of Indian Academy of Paediatrics.

**Results:** The total number of cases collected in the ward in a period of 8 months was 80, out of which there were 51 male child (63.5%) and 29 female child (36.5%) treated with antibiotics for respiratory tract infections. Most of the children were admitted with the symptoms of cold (98.75%) n=79 and fever (86.25%) n=69. Amoxicillin and gentamicin was the most common drug prescribed.

**Conclusion:** Inaccurate dose of antibiotics were seen in the prescription, which may lead to resistance. In order to reduce the risk of antibiotic resistance of bacteria, appropriate usage of antibiotics should be carefully instituted and implemented.

**Keywords:** Paediatrics, Antibiotics, Respiratory Tract Infection, Prescription Pattern

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**INTRODUCTION:**

The frequent use of antimicrobial drugs, primarily antibiotics has become a predictable practice for the treatment of paediatric infections [1,2]. The key role of antibiotics for the treatment of infectious diseases that are prevalent everywhere in the modern world may not be denied. However, there are also reports of an irrational use of antibiotics [3]. Lower respiratory tract infections are considered to be far more serious condition than upper respiratory infections, such as the common cold. They are usually caused by viruses, but they can also be caused by bacteria. The most widespread respiratory tract infection is the common cold. Infections of the upper respiratory tract affect the nose, sinuses and the infections of the lower respiratory tract usually affect the airways and lungs.

Pneumonia is an infection of the small air sacs of the lungs known as the alveolar sacs and the associated tissues, and is one of the most common causes of death across the world [4]. Bronchitis is swelling and inflammation in the air passages such as, the tubes that connect the windpipe to the lungs. It leads to swelling and irritation of the respiratory tracts. Acute bronchitis usually produces cough along with phlegm, and pain behind the breastbone when you breathe deeply or cough [5]. An observational study found a lesser antibiotic prescription rate for childhood respiratory tract infections. The taste of the antibiotic suspensions and other administrative challenges affect medication compliance in children. In order to reduce the antibiotic resistance, guidelines need to be followed, in particular for our youngest patients [6]. The effects of a multifaceted educational intervention was carried out to reduce antibiotic prescription rates for acute respiratory tract infections and to reduce the use of broad spectrum antibiotics. The intervention led to improved antibiotic prescribing for respiratory tract infections [1]. A descriptive cross sectional study to assess the prescription pattern of antibiotics by physicians showed that Amoxicillin was the most prescribed antibiotic followed by Metronidazole. Almost all of

the antibiotics were prescribed in oral form and were available for dispensing at the pharmacy at the time of prescription.

The main aim of this study was to assess antibiotic prescribing pattern in a tertiary care hospital, to promote the safe and effective use of antibiotics and to minimise the emergence of bacterial resistance in the community.

**MATERIALS AND METHODS:**

The study was carried out in the inpatient paediatrics department of a tertiary care hospital after getting approval from the Institutional Ethics Committee, School of Pharmaceutical Sciences, Vels University (IEC/DOPI/2015/02). Children from 1 month to 12 years, who were diagnosed with respiratory tract infections, were included for the study. Children with other co-morbid conditions were excluded from the study. The children were categorized into neonate (Birth -1month), infants (1 month-3 years), young child (2-6 years) and child (6-12 years). The demographic details of the children, antibiotic prescribed, its dose, duration, and appropriateness of antibiotics were all recorded in a data entry form. Informed consent form was given to the children's parents and their consent was obtained, before entering the data. Accuracy of doses was assessed by the guidelines of Indian Academy of Paediatrics. Results were analysed statistically.

**RESULTS:**

A total of 80 children were included for the study. Among them, 51 (63.75%) were male children and 29 (36.25%) were female children. The children were categorized into neonate, infants, young child and child depending on their ages. Majority of the children were in the age group of 6-12 years (n=28, 56%), followed by 1 month to 3 years (n=25, 31.25%), 22 children (27.5%) in infants and 5 children (6.25%) in neonate.

Pneumonia and asthma were the most common infections found in children. The age distribution of diseases was summarised in table 1.

**Table 1: Age distribution of diseases**

Age group	Overall	Tonsillitis	Otitis media	Pneumonia	Asthma	Rhinitis
< 1 year	15% (n=12)	0% (n=0)	11.25% (n=9)	1.25% (n=1)	1.25% (n=1)	1.25% (n=1)
1-6 years	50% (n=40)	5% (n=4)	5% (n=4)	17.5% (n=14)	18.75% (n=15)	3.75% (n=3)
7-12 years	35% (n=28)	8.75% (n=7)	1.25% (n=1)	11.25% (n=9)	8.75% (n=7)	3.75% (n=3)

Antibiotics were prescribed depending on the infections. Gentamicin was most commonly prescribed to children suffering from tonsillitis, asthma, pneumonia and rhinitis, ampicillin for otitis media. The antibiotics prescribed among the children based on their infections were listed in table 2.

Oral antibiotics were given to all the children. The past medical history of the children revealed that the children were suffered from pneumonia several times, followed by asthma. The detailed occurrence of infections was shown in table 3.

Among the antibiotics prescribed, ampicillin and gentamicin were seen in 26 prescriptions, cefixime

and gentamicin in 11 prescriptions, ciprofloxacin and gentamicin in 5 prescriptions, cefotaxime and gentamicin in 3, gentamicin in 2, followed by ciprofloxacin and amoxicillin, cefixime, ciprofloxacin each in 1 prescription.

The appropriateness of antibiotics prescribed was given in table 4, comparing with the guidelines of Indian Academy of Paediatrics. Among 26 prescriptions with ampicillin, 21 prescriptions were with optimum dose, strength and frequency. Among 47 prescriptions with gentamicin, 32 prescriptions were with optimum dose, strength and frequency.

**Table 2: Antibiotics among population**

Diagnosis	Amox	Genta	Ampi	Cipro	Cefo	Cefixime
Tonsillitis	1	10	3	1	1	0
Otitis media	0	14	17	2	1	0
Pneumonia	0	6	6	1	1	6
Asthma	0	12	0	2	0	6
Rhinitis	0	5	0	1	0	0

**Amox-Amoxicillin**  
**Genta-Gentamicin**  
**Ampi-Ampicillin**  
**Cipro-Ciprofloxacin**  
**Cefo-Cefotaxime**

**Table 3: Past medical history**

Infections	Never	Once	2-3times	4-5 times
Tonsillitis	2	5	2	2
Otitis media	9	4	1	0
Pneumonia	2	4	12	6
Asthma	3	6	9	5
Rhinitis	0	0	2	5

**Table 4: Appropriateness of antibiotics prescribed**

Antibiotics	Dose			Strength	Frequency	
	Over	Under	Optimum	Correct	Correct	Incorrect
Ampicillin	0	5	21	21	21	5
Gentamicin	5	10	32	32	32	15
Ciprofloxacin	0	3	4	4	4	3
Cefixime	1	0	11	11	12	0
Amoxicillin	0	0	1	1	1	0
Cefotaxime	0	0	3	3	3	0

Running nose was the most common reason for the children to be admitted in the hospital (n=79, 98.75%), followed by fever (n=69, 86.25%) and cough (n=67, 83.75%). The detailed reason for admission of children in the hospital was depicted in table 5.

Table 5: Reasons for admission of children

Reasons for admission	Percentage (n)
Fever	86.25% (69)
Ear pain	32.5% (26)
Head ache	16.25% (13)
Shivering	11.25% (9)
Vomiting	15% (12)
Cough	83.75% (67)
Running nose	98.75% (79)
Sore throat	15% (12)
Throat pain	18.75% (15)
Shortness of breath	5% (4)
Breathing difficulty	13.75% (11)
Wheezing	7.5% (6)
Crepts	30% (24)

### DISCUSSION:

The total number of study population included during the study period was 80 and majority of the children were boys (n=51, 63.5%). It was similar to the study conducted by Klassen AF et al. (2004) [7]. Among the study population the age was categorized into 4 groups such as Neonates (from Birth- 1month), Infant (1month-3yrs) young child (2-6yrs), and child (6-12yrs). Majority were in the age group between 6-12 years (child). It is contrast to the study conducted by Prabahar K (2017) in which majority of children were in the age group of 1-5 years [8]. Frequency percentages of antibiotics prescribed for specific diagnosis was assessed. It shows that gentamicin (aminoglycosides) was the mostly commonly prescribed antibiotic (57.5%). It was similar to the study conducted by Otters HBM et al. (2004) [9] and was contrast to the study conducted by Prabahar K et al. (2017), [10] where cephalosporins were the most commonly prescribed antibiotics.

The various dosage forms of drug usage were screened during this study period. All the children were given oral preparations. It was similar to the study conducted by Getachew E et al. [10]. The screening done on children's health related history revealed that majority of children had history of fever with cold and cough (85%). It was similar to the study conducted by Campbell LA et al. (1998) [11]. Dual antibiotics commonly prescribed in this study population were ampicillin and gentamicin. It was similar to the study conducted by Shann F et al. (1984) [12].

Aminoglycosides was the commonly used class of antibiotics; among which, gentamicin was found to be the mostly prescribed drug in this study. The pediatric dose of gentamicin for children >5 years is 2-2.5mg/kg/dose/IV/IM/q8hrs and for those <5 years is 2.5 mg/kg/dose/IV/IM/q8hrs. Among the study

population an overdose was seen in 10% of population and under dose in 16% of the study population. This can lead to the development of resistance to the antibiotics among the individuals. Hence appropriate and rational use of antibiotics is very essential to prevent resistance especially among children.

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